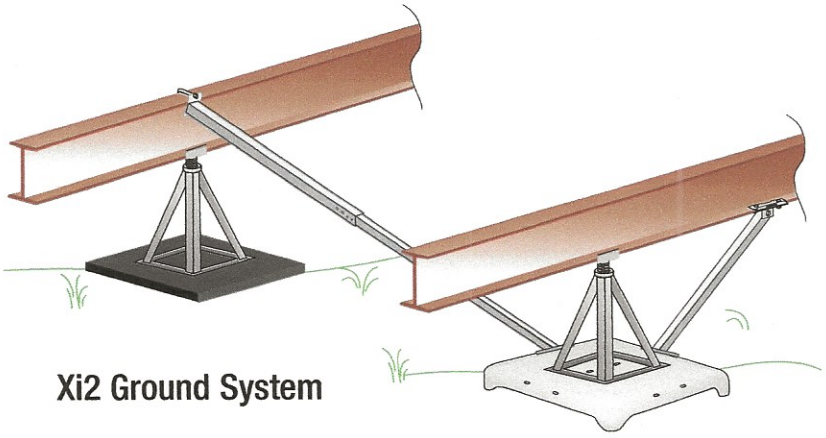
Xi2 Foundation System

Installation Instructions for California for Ground & Concrete Systems California Residential Code (CRC) 2022 Wind = 105 mph Ultimate, Exposure C; Seismic Design Category Max. D2 By Tie Down

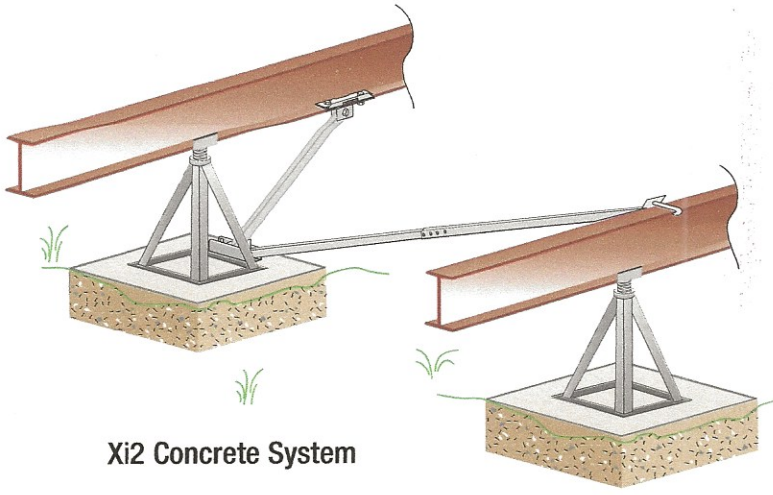


Xi2 Ground System

REGISTERED PROFESSIONAL ENGINEER
WILLIAM C. FARISH IV
C 30123
CIVIL
STATE OF CALIFORNIA

10-07-22

Engineer Approval



Xi2 Concrete System

State Approval

MANUFACTURED HOME/MOBILE HOME
FOUNDATION SYSTEM
HEALTH AND SAFETY CODE, SECTION 18551
APPROVED

APPROVAL DOES NOT AUTHORIZE OR APPROVE ANY OMISSIONS OR DEVIATION FROM REQUIREMENTS OF APPLICABLE STATE LAWS AND REGULATIONS
State of California
Department of Housing and Community Development
DIVISION OF CODES AND STANDARDS

BY _____ (signature) DATE 10/17/22

SPA NO 121-1F

This Plan Approval Expires 10/27/24

Approved for Flood Zone A; AE ~ AH

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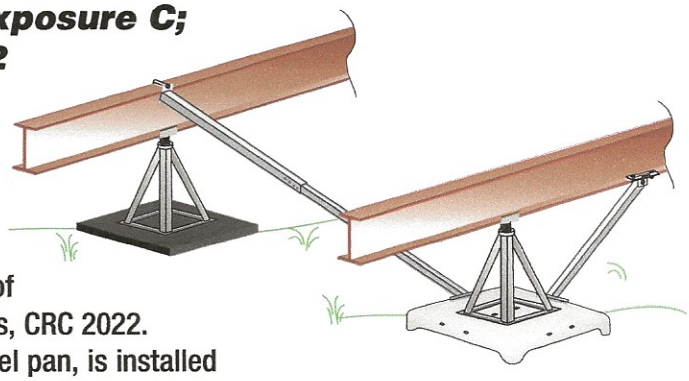
Xi2 Foundation System

Installation Instructions for California for Ground & Concrete Systems CRC-2022, 105 mph Ultimate Wind Exposure C; Seismic Category Max. D2

By Tie Down



REQUIREMENTS:

- These plans and specifications meet the requirements of Title 25 Section 1333 and Wind & Seismic Requirements, CRC 2022.
- The Xi2 System, with either a concrete footer or the steel pan, is installed at or in place of one of the piers required by the home manufacturer's set up instructions. The systems must be placed as evenly as possible. Measuring from the center of the pier, systems are to be located a minimum of 2' and a maximum of 1/4 the length of the home from each end of the home as shown on pier placement chart.Components of the Xi2 system such as the longitudinal strut and connecting hardware, may extend beyond the pier location.
- Maximum vertical projection at sidewall is 10' (see charts).
- Main rail spacing must be 75.5" - 99.5" (112" allowed with proper strut).
- The lateral and longitudinal components of the Xi2 System replace standard frame ties. Additional Vertical anchor ties that are unique to a home's design may be required by the home manufacturer. These locations may include shear walls, marriage line ridge beam support posts, and rim plates. Check manufacturers set-up requirements.
- Maximum pier height is 48".
- Maximum floor widths are 16' (single section), 32' (double) and 48' (triple).
- Steel piers must be fastened to the I-beam with clamps provided with steel pier.
- Designed for up to 6:12 roof slope.
- Flood Zone: A, AE or AH Zone flood plain (riverine or inland flood area); Max flood velocity - 1 fps: No waves, Bottom of home main beam is at or above BFE; bottom of main beam max 36" above natural grade. Not suitable for V zones, coastal A zones or floodways. Install Tie Down Engineering anchors per table (on page 7) to resist flotation.
- Designed to provide resistance up to Seimic Design Category D2 Earthquake Loads.
- Maximum roof live load is 100 psf (see charts).

Additional Requirements for Concrete Systems

- Poured concrete must be 2,500 PSI minimum at 28 days.
- Footings must be large enough for pier load at that location and be a minimum of 22" wide by 6" deep with anchor wedge bolts a minimum of 4" from any edge, or 18" wide by 12" deep with wedge bolts a minimum of 1-1/2" from edge. Strip footings to be minimum of 18" wide by 14' long by 6" deep or 27" wide by 14' long by 4" deep.

* Xi2 components exceed HUD code 3280.306g requirements stating "Anchoring equipment exposed to weathering shall have a resistance to weather deterioration at least equivalent to that provided by a coating of zinc on steel of not less than 0.30 ounces per square foot of surface coating...."

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Installation of Xi2 Ground Systems

1. Identify the number of systems to be used on the home using the chart provided.
2. Identify the location where the systems will be installed.
3. Clear all organic matter and debris from the pad site.
4. Place U-bolts through holes in pan provided.
5. Place pad centered under beam with the lateral strut bracket towards the inside of the home.
6. Press or drive pan into ground until level and flush with prepared surface.
7. Build pier according to State, Local or Home Manufacturers guidelines. *(Figure 1)*
8. Attach the end of the smaller tube to the inside of pan using U-bolt & nuts provided
9. Attach the flag end of the larger tube to the opposite I-beam using the "J" bolt over the top of the I-beam with the nut & washer provided. *(Figure 2)*
10. Install a minimum of four (#12 x 1" tek screws) self-tapping screws into the holes provided in the lateral strut so that the two tubes are connected together. *(Figure 1)*

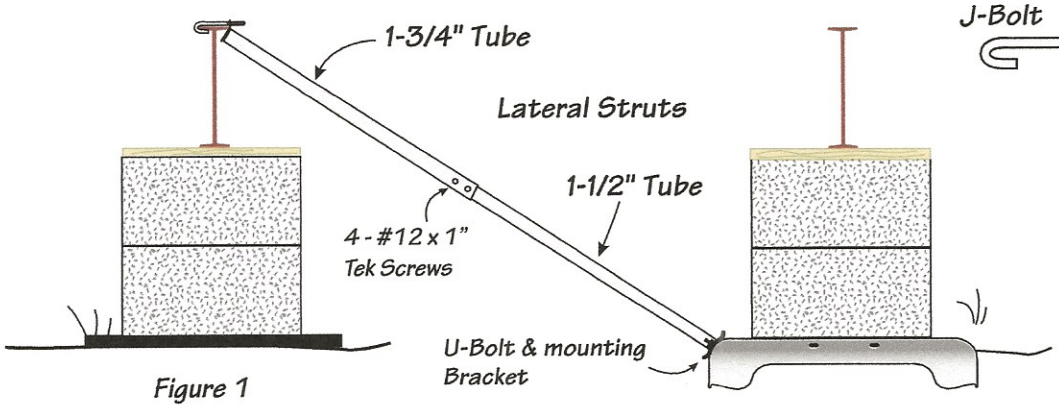


Figure 1

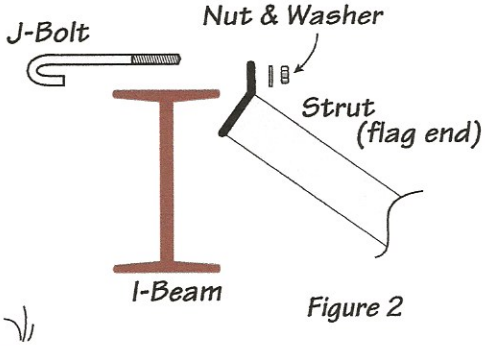
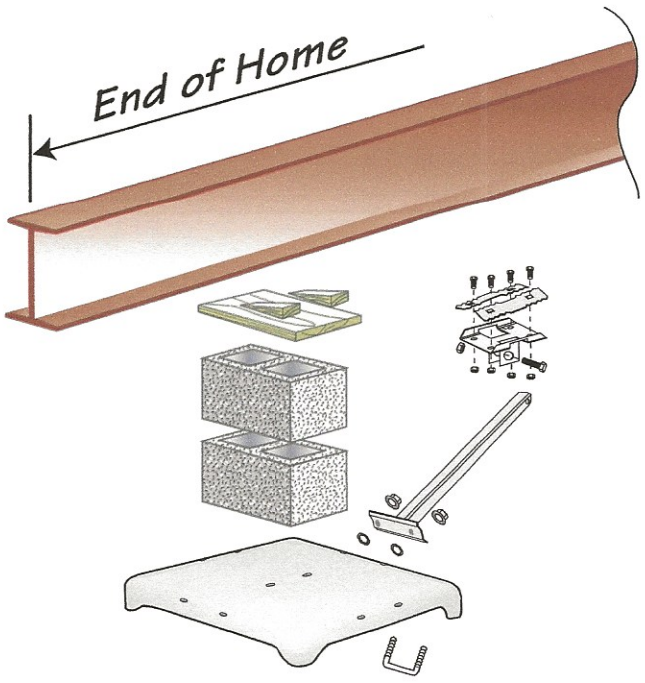


Figure 2



11. Install frame bracket clamps to I-beam on in side of block/pier. Do not tighten nuts at this time.
12. Attach longitudinal strut to U-bolt in pan using nuts provided.
13. Insert strut in the frame bracket clamp, attach with nut and bolt. Do not tighten at this time.
14. Pull the frame bracket clamp with the fastened strut outward to remove any slack.
15. Tighten all nuts and bolts on the struts and beam clamps.

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Xi2 Ground Parts Detail

Xi2 Ground Lateral System
Part Number 59306
Includes: 5' Strut, pad & hardware kit (#59329-1 includes all nuts and bolts).

Longitudinal Hardware Kit
Part Number 59331
Includes: 2 I-beam brackets & 2 U-bolts with all nuts and bolts.

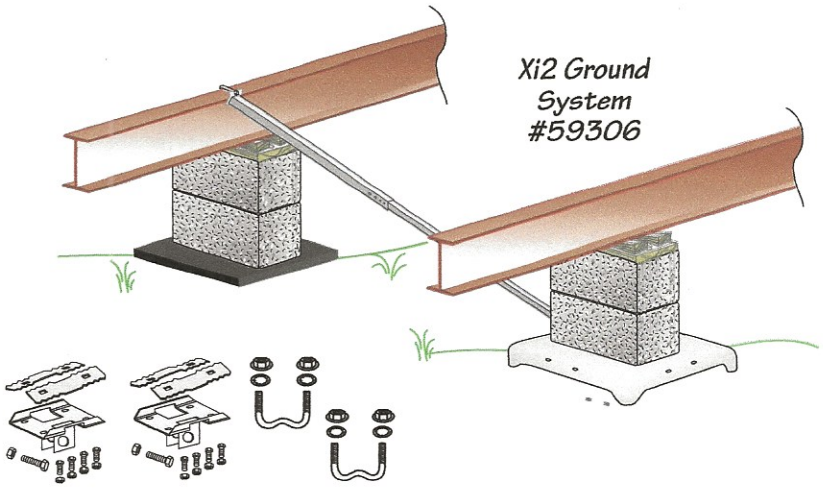
Lateral and Longitudinal Combination
Part Number 59333
Includes: 5' Strut, Pad, Longitudinal Strut (#59329), Lateral and Longitudinal Hardware Kit with all nuts and bolts.

Struts for Longitudinal Systems

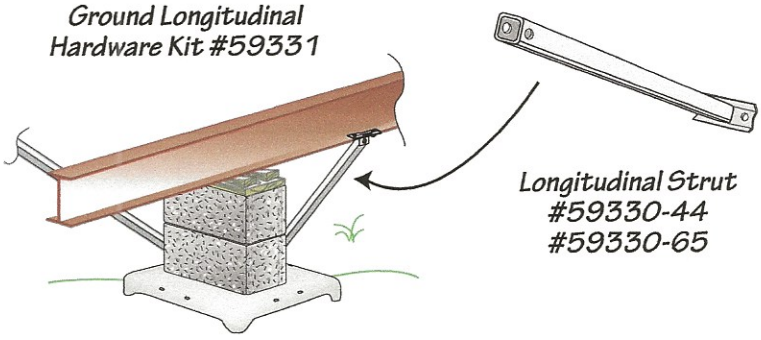
Part No.	Strut Length	Pier Height Up To:
59330-44	44"	4 Blocks or 32"
59330-65	65"	6 Blocks or 48"

For Double I Beam Attachment Use:
59352 Double Beam Longitudinal Bracket
29329-3 Double Beam lateral Ground kit

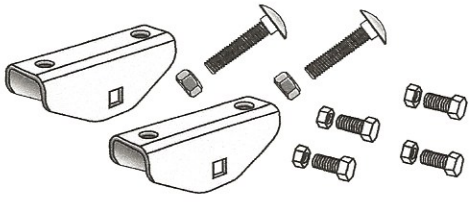
For C or CR Beams use:
59618 C Beam Bracket kit



Ground Longitudinal Hardware Kit #59331



Lateral & Longitudinal Combination #59333



C-Beam Bracket Kit #59618

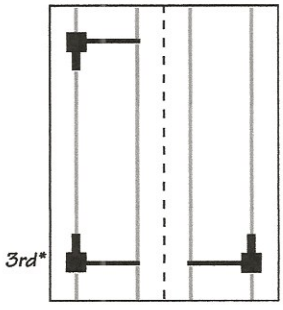
Xi2 Stabilization System Placement for up to 9 ft. Sidewall - 30 psf Roof

Xi2 Pier Placement

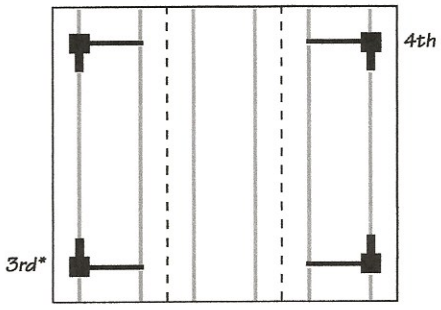
Approved Anchor with straps from 45 to 90 degress

Both lateral and longitudinal systems at each location.

Single Section Home
0 - 76' Box 2 Xi2 Systems



Double Section Home
0-68' Box 2 Xi2 Systems
Over 68'-76' 3 Xi2 Systems*



Triple Section Home
0-70' Box 3 Xi2 Systems*
Over 70' - 76' 4 Xi2 Systems

*3rd Xi2 system can be placed at either end of the home.

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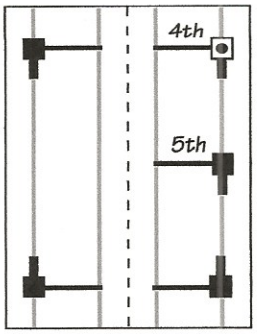
Xi2 Stabilization System Placement for 10 ft. Sidewall - 100 psf Roof

Xi2 Pier Placement

Extra Pier Placement

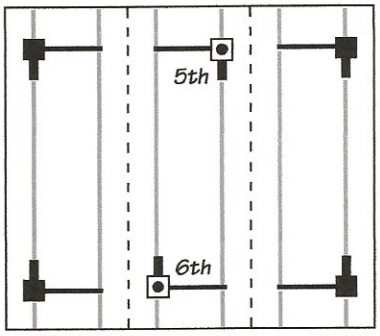
*2 Xi2 systems can be placed at either end of the home.

Both lateral and longitudinal systems at each location.



Double Section Home

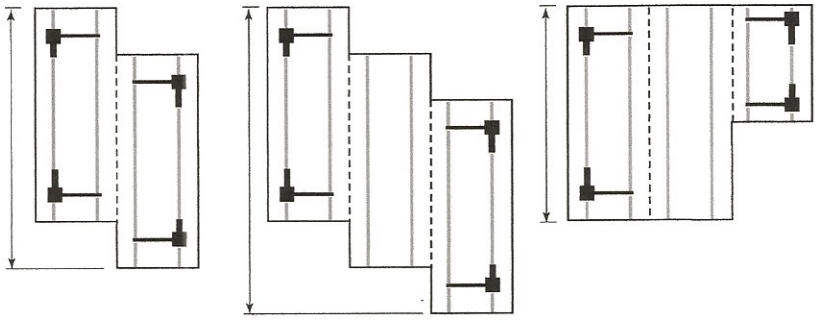
0 - 54'	3 Xi2 Systems*
Over 54' - 74'	4 Xi2 Systems
Over 74' - 76'	5 Xi2 Systems



Triple Section Home

0 - 48'	4 Xi2 Systems
Over 48' - 62'	5 Xi2 Systems
Over 62' - 76'	6 Xi2 Systems

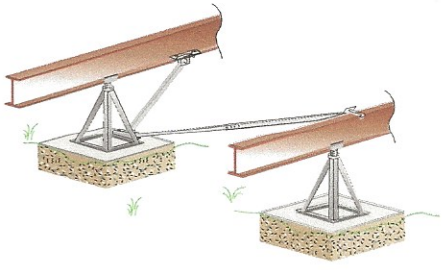
Offset Placement



Diagrams represent examples of double and triple section offsets. Total size is determined by the length of unit plus offset. The number of systems needed would be based on Home Size Charts. For "Quad" Units install systems as 2 Double sections.

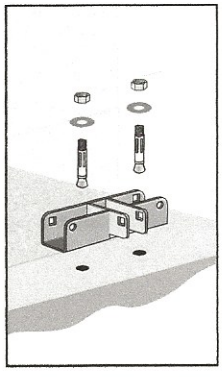
Alternate Anchoring Method: As an alternate to the requirement for ground anchors at the corners of a single section home, approved concrete anchors may be installed into poured concrete footings 18" x 18" x 48" deep. If shallow footing are desirable, and local frost line requirements allow it, footings a minimum of 24" x 24" x 12" deep may be used, with an anchor, at all four corners with the addition of one footing and anchor in the middle of each side, for a total of 6.

Anchors along the sides of a single section may have the straps connecting either vertically to the sidewall, or diagonally to I-beam.



Installation of Xi2 Concrete Systems

1. Identify the number of systems to be used on the home using the chart provided.
2. Identify the location where the systems will be installed.
3. Build pier according to State, Local or Home Manufacturers guidelines.
4. Drill two 3/8"x 3" deep holes in the concrete using holes in galvanized bracket as a guide.
   Attach bracket to concrete pad using 3/8"x 3-1/2" wedge anchors provided. Place nut & washer on anchor, leave enough room for 1 to 2 threads showing on top of bolt. Using a hammer, tap the wedge bolts into hole through bracket, leaving nut & washer flush with bracket. Using a 9/16" socket wrench, tighten wedge/anchor bolt, securing bracket to the concrete.
5. Attach the end of the smaller tube to the bracket mounted on the pad, using the grade 5, 1/2" x 2-1/2" bolt/nut provided.
6. Attach the flag end of the larger tube to the opposite I-beam using the "J" bolt over the top of the I-beam with the nut & washer provided. *(Figure 1 next page)*
7. Install a minimum of four (#12 x 1" tek screws) self-tapping screws into the holes provided in the lateral strut so that the two tubes are connected together
8. Install frame bracket clamps on I-beam on the inside of block/pier.
9. Insert strut in frame bracket clamp and attach with nut & bolt. Attach opposite end to concrete bracket.
10. Pull the frame bracket clamp with fastened strut outward to remove any slack.
11. Tighten all nuts and bolts on system.



Xi2 Concrete Parts Detail

Part #59307
Includes: 5' Strut, Bracket, & Hardware Kit #59315-1 with all nuts and bolt.

Longitudinal Struts for "Concrete Systems"

Part No.	Length	Pier Height
#59013	44"	up to 4 Blocks
#59015	65"	up to 6 Blocks

Longitudinal Hardware Kit
Part #59263
Includes 2 sets per kit: I-beam bracket, nuts, bolts and washers

Lateral and Longitudinal Combination
Part #59332
Includes: 5' Strut, Longitudinal Strut (#59364), Lateral and Longitudinal Hardware Kit with all nuts and bolts.

For Double I beam Attachment use:
59352 Double Beam Longitudinal Bracket
59329-4 Double Beam Lateral Concrete kit

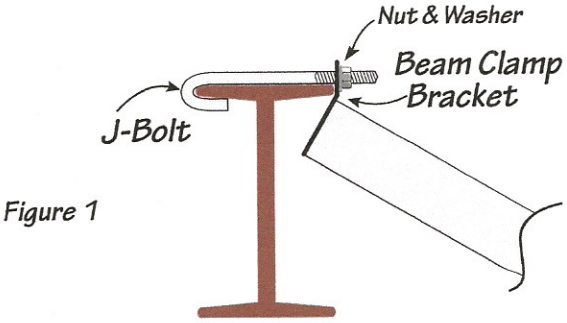
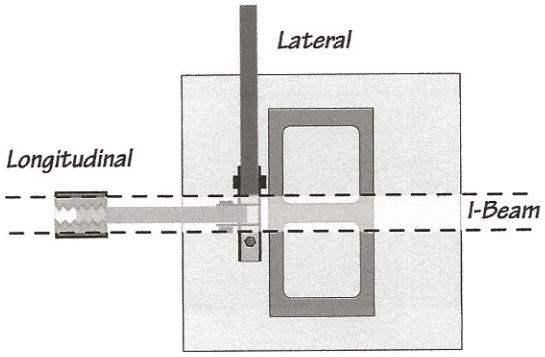
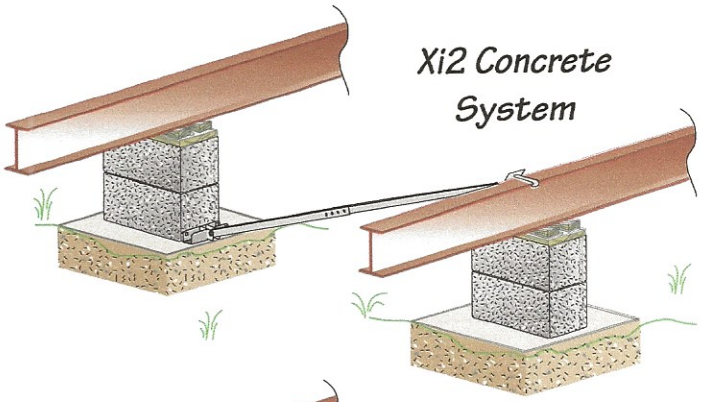
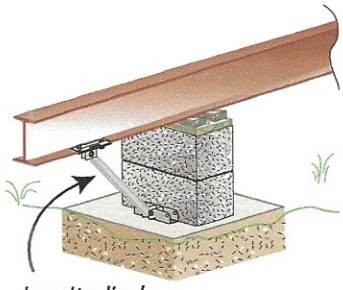


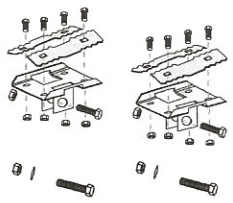
Figure 1

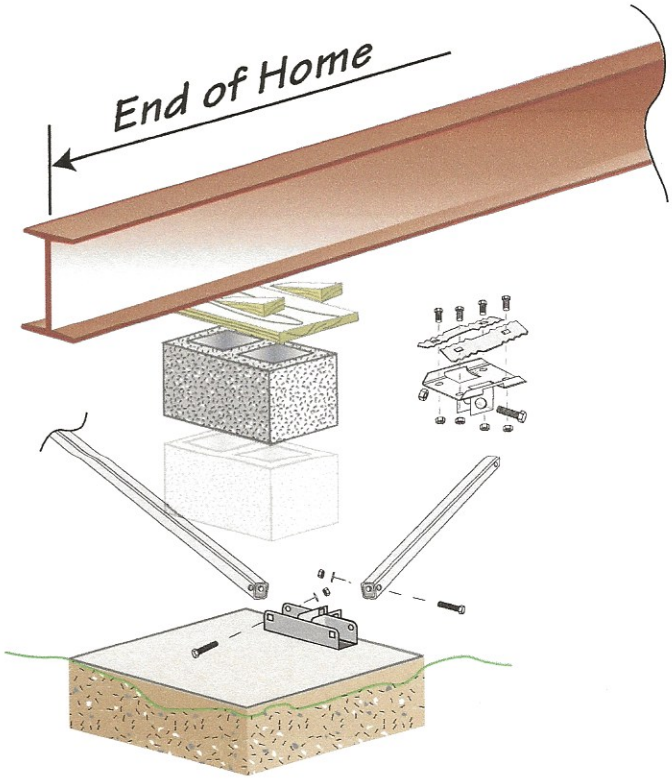


Xi2 Installation Placement






Concrete Longitudinal Hardware Kit



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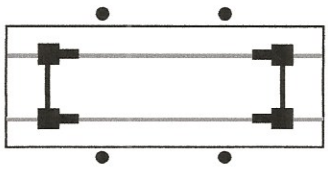
FEMA Flood Zones A, AE & AH



Anchor placement to be the same on single or multiple sections. Evenly spaced from the end of unit, between Xi2 placements.

Flotation Anchors	Total
Single Section	**Anchors Per Side**
12' x 40' – 16' x 80'	2
Multiple Section	
20' x 40' - 20' x 64'	2
24' x 40' - 24' x 56'	2
Over 56'	2
28' x 40' - 28' x 48'	2
28' x 49' - 28 x 72'	2
Over 72'	2
32' x 56' - 32' x 64'	2
Over 64'	2

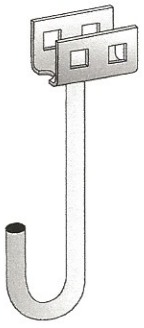
When using concrete anchors in Lieu of ground auger anchors, the Mass of Concrete Per Anchor from chart would be: 21.1 Cu. Ft.
(Example: 3'x 3'x 2.5' = 22.5' Cu. Ft., 2' dia. x 3.5'= 22' Cu. Ft.)

To Reduce the Mass of Concrete, increase the number of tie downs proportionally.

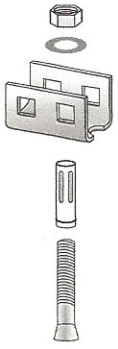
To Reduce concrete to 11 cu. ft. (Example: 2.25' x 2.25' x 2.25'=11.4 Cu. Ft.) double the required number of tie downs.

Concrete Anchors

Concrete must be 2500 PSI minimum slab with a 4" minimum thickness and must allow 4725 lbs. of vertical tension on anchor without lifting. Minimum distance from the anchor shaft to one edge of the slab is 4" from one edge and 6" from any other edge. MIJ2 anchor is designed to be installed into the concrete at the time it is being poured. Slab must be 8" minimum thickness at location under anchor to allow 5" embediment of "J" rod anchor. MICS2 anchor is designed to be installed in dry concrete. Drill a 5/8" x 3" hole in the slab place expansion bolt in hole, place washer and nut over bolt and tighten until maximum expansion is achieved. Remove nut and washer and place anchor head over exposed bolt and place washer and nut back on threaded bolt and tighten nut.



MIJ2
"J" Anchor

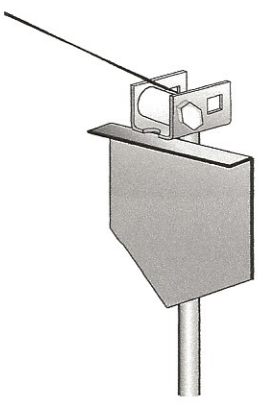


MICS2

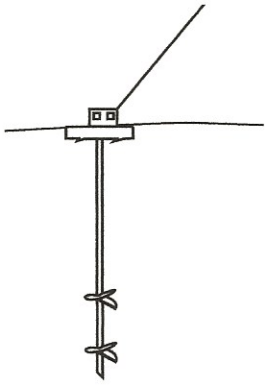
Ground Anchors

All Frame tie ground anchors must be stabilized to prevent horizontal slicing through the soil.

1. Position anchor at a slight back angle so that when Fully installed, anchor will be inside skirting wall.
2. For vertical or stabilized (Deepset) anchors, fully drive anchor into the ground. Horizontal (Frame Tie) anchors install 2/3 of way in ground and install stabilizer plate vertically within 3"-4" of the shaft, parallel to home.
3. Drive anchor fully into ground until head rests on plate and attach strap. Pretension strap to pull anchor against plate with head slightly over top.



Stabilizer
Plate

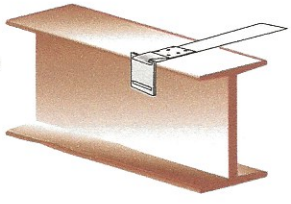


Deepset
Anchor

Frame Tie with Buckle

1. Install strap by pushing the end between the inside of The frame "I" beam and floor.
2. Position the buckle at the upper end of the "I" beam frame. Wrap the end of the strap around the "I" beam. Thread the end of the strap through the slot in the buckle as shown. Push the end of the strap in between the "I" beam and floor.
3. Pull the strap, making certain the buckle stays in position. Thread loose end of strap through the slotted tensioning bolt attached to the tension head of anchor. Tighten slotted bolt a minimum of 4-5 turns until all slack in strap is removed.

1.



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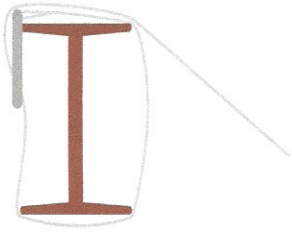

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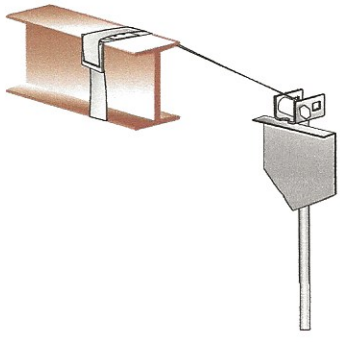

Soil Classification Chart

Soil Class	Soil Description	Recommended Anchors and Stabilizers Model #	STK#	Description
2	Sedimentary and Foliated Rock	MI2255/8	59090	30" x 5/8" rod / 2 - 4" helix
		MI2233/4	59095	30" x 3/4" rod / 2 - 4" helix
			59292	Stabilizer Plate
3	Sandy Gravel and/or Gravel (GW and GP)	MI2H5/8	59080	48" x 5/8" rod / 1 - 6" helix
		MI2H3/4	59085	48" x 3/4" rod / 1 - 6" helix
		Deepset	59091	30" x 3/4" rod / 2 - 4" helix with stabilizer cap
			59292	Stabilizer Plate
4	Sand, Silty Sand, Clayed Sand, Silty Gravel	MI2H5/8	59080	48" x 5/8" rod / 1 - 6" helix
		MI2H3/4	59085	48" x 3/4" rod / 1 - 6" helix
		Deepset	59092	36" x 3/4" rod / 1 - 4" & 1 - 6 helix with stabilizer cap
		MI48	59086	48" x 3/4" rod / 2 - 4" helix
		MI42	59128	42" x 3/4" rod / 2 - 4" helix
			59292	Stabilizer Plate

Higher class anchors can be used in lower class soils. Example; Class 4 anchors can be used in Class 3 soils.

The required flotation anchors shown in the table are in addition to any other anchors or hold down devices required by the manufacturer. See requirements, bullet 5, page 2 of 8.

Xi2 Hardware Breakdown

#59329-1 Hardware for 59306 Lateral System

1	84533Z	U-Bolt 1/2-13 x 2.63 x 2.19 thread 1-3/4 zinc
4	10556	Tek Screw #12 x 1"
1	10631Z	J Bolt 1/2 x 5-1/2 grade 5 zinc
2	10640	Push Nut 1/2
1	12107	Flat Washer 1x2" SS
1	10646Y	Hex Nut 1/2-13 grade 5 zinc
2	10519	Hex Nut 1/2" w/ Serr flange

#59331 Longitudinal Hardware for 59306

2	59272-1	Beam Clamp Base
4	59272-2	Beam Clamp Top Flange
8	10926	Carriage Bolt 1/2-12 x 1-1/4 Full Thread
10	10646Y	Hex Nut 1/2-13 grade 5 zinc
2	10801	Carriage Bolt 1/2-12 x 2-1/2 Grade 5
2	84533Z	U-Bolt 1/2-13 x 2.63 x 2.19 thread 1-3/4 zinc
4	10640	Push Nut 1/2
4	10519	Hex Nut 1/2" w/ Serr flange

#59329 Hardware for 59333 Lateral and Longitudinal combination

1	59329-1	Hardware Kit
1	59272-1	Beam Clamp Base
2	59272-2	Beam Clamp Top Flange
4	10926	Carriage Bolt 1/2-12 x 1-1/4 full thread
5	10646Y	Hex Nut 1/2-13 Grade 5 zinc
1	10801	Carriage Bolt 1/2-12 x 2-1/2 Grade 5 zinc
1	84533Z	U-Bolt 1/2-13 x 2.63 x 2.19 Thread 1-3/4 zinc
2	10640	Push Nut 1/2
2	10519	Hex Nut 1/2" w/Serr Flange

#59315-1 Hardware for Lateral System

1	10631Z	J Bolt 1/2 x 5-1/2 Grade 5 zinc
1	12107	Flat Washer 1/2" SS
4	10556	Tek Screw #12 x 1"
2	10646Y	Hex Nut 1/2x-13 Grade 5 zinc
1	10826	Carriage Bolt 1/2-12 x 3 Grade 5 zinc

#59027 Hardware Kit for 59307 Lateral System

2	59264	3 Way Concrete Bracket
4	10530	Wedge Anchor 3/8 x 3.50
1	59315-1	Hardware Kit

#59263 Longitudinal Hardware for 59307

2	59272-1	Beam Clamp Base
4	59272-2	Beam Clamp Top Flange
8	10926	Carriage Bolt 1/2-13 x 1-1/4 Full Thread zinc
12	10646Y	Hex Nut 1/2-13 Grade 5 zinc
4	10801	Carriage Bolt 1/2-13 x 2-1/2 Grade 5 zinc

#59364 Hardware for 59332 Lateral and Longitudinal combination

1	59264	3 Way Concrete Bracket
2	10530	Wedge Anchor 3/8 x 3.50
1	59315-1	Lateral Hardware Kit
1	59272-1	Beam Clamp Base
2	59272-2	Beam Clamp Top Flange
4	10926	Carriage Bolt 1/2-13 x 1-1/4 Full Thread zinc
2	10801	Carriage Bolt 1/2-13 x 2-1/2 Grade 5 zinc
6	10646Y	Hex Nut 1/2-13 Grade 5 zinc

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